CLAIMS

1. A CI transmission system employing PAPR-reduction signaling, the CI transmission system including:
   - a symbol-mapping module adapted to allocate a predetermined number of data bits to a predetermined set of subchannels,
   - a CI coder adapted to perform at least one predetermined combination of data spreading and channel coding to produce a plurality of input symbols,
   - a carrier-generator module adapted to associate the input symbols with at least one set of subchannels and generate a corresponding time-domain sequence representing a data-payload signal, and
   - an unloaded channel-encoding module adapted to select unloaded subchannels for transmission of at least one PAPR-reduction signal.
2. The CI transmission system recited in Claim 1 wherein the unloaded channel-encoding module is adapted to select and generate at least one unloaded subchannel for combining with the time-domain sequence when the time-domain sequence exceeds a predetermined power threshold.
3. The CI transmission system recited in Claim 2 wherein the unloaded channel-encoding module is adapted to generate PAPR-reduction signals in unloaded subchannels and combine the PAPR-reduction signals with the time-domain sequence until the time-domain sequence power drops below a predetermined threshold.
4. The CI transmission system recited in Claim 1 wherein the symbol-mapping module is adapted to generate unloaded subchannels by not loading subchannels that are compromised by adverse channel conditions.
5. The CI transmission system recited in Claim 1 wherein the unloaded channel-encoding module is adapted to maintain the data-payload signal below a predetermined clipping threshold.
6. The CI transmission system recited in Claim 1 wherein the unloaded channel-encoding module is adapted to combine the at least one PAPR-reduction signal with at least one of the plurality of input symbols and the data-payload signal.

7. The CI transmission system recited in Claim 1 wherein the symbol-mapping module is adapted to cease loading at least one predetermined subchannel that is below at least one predetermined channel-quality metric such that the unloaded channel-encoding module is capable of selecting said predetermined subchannel for transmission of at least one PAPR-reduction signal.
8. The CI transmission system recited in Claim 1 wherein the symbol-mapping module is adapted to allocate a predetermined number of data bits to at least one of a set of subchannels including space-frequency subchannels, space-time subchannels, CI phase-space subchannels, spatial sub-channels, and polarization subchannels.
9. The CI transmission system recited in Claim 1 wherein the symbol-mapping module is further adapted to select which of a plurality of sequence permutations of the predetermined number of data bits results in the greatest reduction of PAPR in the data-payload signal.
10. A multicarrier transmission system adapted to reduce the effects of high PAPR including:
    - a CI coder adapted to spread at least one data sequence with at least one set of CI codes for generating at least one set of CI-coded symbols,
    - a sub-carrier generator adapted to map the at least one set of CI-coded symbols onto a plurality of subcarriers,
    - a plurality of combiners adapted to combine sets of the plurality of carriers for producing a plurality of CI-coded time-domain sequences that are characterized by low PAPR, and
    - a plurality of power amplifiers coupled to the plurality of combiners, the amplifiers adapted to amplify the plurality of CI-coded time-domain sequences.
11. The multicarrier transmission system recited in Claim 10 further including an amplified-signal combiner coupled to the plurality of power amplifiers.
12. The multicarrier transmission system recited in Claim 11 wherein the amplified-signal combiner includes at least one of a set including an antenna, a waveguide, and a multi-port junction.
13. A multicarrier signal generator including:

- a pulse-train generator adapted to generate a sequence of pulse waveforms having a predetermined spectrum,
- a CI coder capable of generating at least one CI code, and
- a carrier selector coupled to the CI coder and the pulse-train generator, the carrier selector adapted to impress the at least one CI code onto the sequence of pulse waveforms to shape the predetermined spectrum.